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ABSTRACT

Designed to pilot a particular technique for eliciting imaginative constructions centered on the microcomputer, this exploratory study used a "projective" type method with a game format that required group performance. Students in a mixed class of 88 graduate students enrolled in a course on social thought were directed to generate multiple fantasy narratives around computer use. To do this, each student was given a sheet of paper with the first line of a story--"Norman (or Jane) sat down at the computer"--and instructed to write the next line of the story. The sheets were then folded in such a way that only the last sentence written was visible and passed down four seats to the left. As the students received the next sheet, they added another sentence and this procedure was repeated until the completed stories averaged 6 to 7 lines in length. Analyses of the data to identify and illustrate qualitative themes and patterns in the stories found the predominant thematic dimension to be the hedonic continuum, from pleasure to pain, with a distinct bias in content toward the latter. A comparison of the results with Gregory Bateson's theories on man and high technology concludes the paper, and an extensive reference list is provided. (RP)

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MACHINE DREAMS:

COMPUTERS IN THE FANTASIES OF YOUNG ADULTS

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Norman sat down at the computer.
He placed his apple on top of the terminal.
He thought of taking a byte of his apple and laughed.
But maybe the fruit is forbidden, he thought.
Second thoughts flooded his mind.

The narrative above is a fantasy story constructed collaboratively by five young adult subjects. In this chapter, I would like to make use of a number of such fantasies to illuminate the shadowy universe of symbolic phenomena that, beneath the level of awareness, is associated with the microcomputer. In so doing, it is my intention to take a byte out of the area that has come to be known as "political psychology."

Specifically, I want to suggest one way in which we might begin what Bateson called a 'metalogue' on the dynamic meaning of high technology in the contemporary cultural unconscious. This meaning seems to me to be at one and the same time both personal and social, and at both levels to be of exceptional significance to our historical self-awareness and our possible future. But we should be prepared for the fact that, in the words of our subjects' story above, examination of this meaning may release a flood of second thoughts about computer technology.

Mind, Self, and Society

Gregory Bateson is celebrated for many things in particular but one overarching contribution in general: the synthesis of approaches from genetics, ethology, anthropology, epistemology, and family sociology through cybernetics to yield a comprehensive, evolutionary, systems-theoretical worldview for the social and ecological sciences (Bateson, 1972; 1979). He even

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wrote about world-views themselves (Bateson, 1968). Not content with mere metatheory, he argued the merits of his vision in terms of specific issues and studies. Five of his major preoccupations were the relation between mind and body (Bateson, 1976, 1980), the question of self or agency (Bateson, 1970, 1971), the importance of relationship and dialogic interaction (Bateson, 1972; Ruesch & Bateson, 1951), the problem of power (Bateson, 1974, 1978), and the possibilities of transcendence (Bateson, 1970, 1982). (1)

The research to be reported below recapitulates the same old philosophical chestnuts. It does so opportunistically, taking advantage of the extraordinary contemporary technological and cultural phenomenon centered upon the microcomputer. It is my conviction that high technology is a new kind of prism as well as a new kind of prison. The dark side, the creation of more deeply entrenched and pre-emptive structures of social discrimination and control, has been expertly documented and explicated (Weizenbaum, 1976; Dreyfus, 1979; Greene, 1985; Solomonides & Levidow, 1985; Noble, 1985; Olson, 1985; Sloan ,1985; Sullivan, 1985). On the bright side, the construction of sophisticated mechanisms for the manipulation of symbols has brought with it a less visible but nonetheless real semiotic potential. Between the lines, at the level of unconscious symbolism, the technology of microcomputers suggests a fresh discursive matrix in which old philosophical problems such as psychophysics, subjectivity, intersubjectivity, and immanence-transcendence are refracted in novel ways, emerging in a vivid spectrum of fresh images. The creative imagination embodied in the technology bursts out in unintended ways, generating deeper and more powerful visions of the relations between mental and material, and self and other.

It would hardly be guesswork to assume that, as one of the earliest and most active proponents of the metaphoric power latent in the language of the information and communications sciences, Bateson would have been much stimulated by the recent events of the "electronic revolution." He was certainly not reticent to borrow metaphors from the world of computing (Bateson, 1972, p. 454; M.C.Bateson, 1972, pp.52-53). Also, given his researches in psychiatry (e.g., Bateson, Jackson, Haley, & Weakland, 1956; Bateson, 1960, 1966) and his interest in fantasy (1955, 1973), the psychodynamic drift of the following analysis is not far from his bailywick. What would have piqued his curiosity, I hope, is the notion that, rather than applying cybernetic metaphors to psychiatry, we need the converse, a psychiatric approach to computing (cf. Faber, 1984).

The Symbolic Meaning of Computers

Because the computer now represents the very essence of symbolic mastery, and programming the propadeutic human skill, we tend to forget that the computer itself has a meaning that is not necessarily reducible to formal organization or the manipulation of information. What it does fails to exhaust what it is.

Although programming efficiently generates consistency, there is still something imprecise about it -- the aura that it takes on in the public imagination. One only has to think of the polymorphous and ambivalent way in which computers have been taken up into the sphere of popular culture, in mass market feature films, music videos, advertising, even robotic styles of dance and metallic clothing materials.

One of the most profound meanings that the computer has for us, then, is the very uncertainty of what it means to us. In the technical domain, its performance conforms well to the modern ideal of infinite utility and functional stability. In the alternative, but equally "real" cultural realm, it appears to be strictly mercurial, capturing in an exquisitely poignant way the potential for polarizations, reversals, and ruptures of meaning. Here, the system seems to be at the mercy of the unsystematic. If its reality in the one world is the power of action, in the other it is the power of passion. The capacity for simulation residing in the computer has been much touted. But insofar as the computer conceals the deep ambiguity of its own existence with the guise of pure practicality, it reveals to the attentive eye its equal capacity for dissimulation. (2)

The discourse of desire lurking under the thin disguise of electronic rationality has received virtually no attention in the scientific community. I can think of only two exceptions (see Turkle, 1984 and Faber, 1984). If the microcomputer, this technological paragon of objectivity, expresses at the same time a certain cultural subjectivity, then an important new role opens up for the research psychologist: the illumination of that suppressed zone of sensitivity in which the personal meaning of the new technology is at play.

An Exploratory Study of Computer Fantasies

The research to be described has the status of an exploratory study. The aim was to pilot one particular technique for eliciting imaginative constructions centered on the microcomputer. The method employed for this study had three major features: it was of the "projective" type, it employed a game format, and it required group rather than individual performance.

In the middle of an academic term, a mixed class of 88 graduate students was persuaded to comply with a procedure for generating multiple fantasy narratives around computer use. The subjects selected for the study were participants in a popular graduate course in social thought at a graduate school of education in a major east coast urban center.(3) It was assumed that young adult subjects were a suitable population to sample in this way, since they represent the first generation confronting the new work world so extensively transformed by high technology.

The materials consisted of 88 sheets of paper (8' by 11') at the top of which was the first line of a 'story.' Half the stories started with the sentence "Joy sat down at the computer." The other half began, "Norman sat down at the computer." (4) The instructions given (verbally) to the subjects were as follows.

> Each of you has a sheet of paper with the first line of a "story." Please write underneath that sentence a second sentence that could be the next part of the story. Then fold the top of the paper over to cover up the first sentence, so that the next person can see only the sentence that you have just written. Then pass the folded sheet four seats to your left. Whenever you receive a sheet, make sure that only the last sentence is showing, and then write another sentence of the story, and repeat the procedure I just described. Please relax and enjoy yourself as much as possible, and allow your imagination to run free. Don't think too long about your contributions -- just write the first thing that comes into your mind.

The sheets circulated for about 5 minutes, enough time to thicken the plots. The completed stories averaged 6-7 lines in length. Not coincidentally, this coincides with the optimum length for very short stories (Alldis, 1985).

The format of a projective test (Bell, 1948; Frank, 1949;

Anderson & Anderson, 1951) was adopted on the grounds that it is ideally suited to the illumination of "primary process," that is, unconscious dynamic material, typically appearing in the form of quasi-narrative themes (Schafer, 1948; Rosenzweig, 1949; Holt, 1967). The present approach blends two successful standard projective approaches, association and completion (Rotter, 1951). (5)

In order to make a preliminary assessment of the validity of the method, the fantasy narrative data were reviewed informally with respect to Auld, Goldenberg, and Weiss's (1968) 'Scale of Primary Process Thinking.' The majority of the narratives appeared to fall above the minimum level in Auld et al.'s scale, exhibiting features that can be legitimately called "unusual" (Level 2) or "contradictory," "obviously symbolic," or "slightly uncanny" (Level 3). This observation provides at least provisional reassurance that the story completion task stimulated primary process phenomena.

Although quantitative analyses can be applied to projective data in general (Cattell, 1951), and to fantasy themes in particular (Symonds, 1949; cf. Zayas and Broughton, (n.d.), the presentation of the data here is confined to the identification and illustration of qualitative themes and patterns in the stories. The interpretive technique employed draws on the tradition of content analysis as used widely in the social sciences (Lazarsfeld & Baran, 1951; Berelson, 1952; Pool, 1959; Holsti, 1969; Krippendorf, 1980) but resembles most the methods described and validated by Cicourel (1964) and Glaser and Strauss (1967). The identification of specific themes was modeled after the methods of Murray (1938), Symonds (1949), and Gould (1972). (6)

Thematic Content of the Fantasies

The predominant thematic dimension of the sagas was the hedonic continuum, from pleasure to pain, with a distinct bias in content toward the latter. The most frequent scenarios were not concerned with achievement, productivity, or empowerment. If mastery seems to be the dominant issue at the level of conscious thought, it is displeasure that would appear to reign in the unconscious and preconscious. The dysphoric experiences mentioned in the stories crossed the spectrum from boredom to terror, including feelings of compulsion, physical discomfort, torpor, uncertainty, confusion, frustration, inadequacy, anxiety, depersonalisation, dependence, and outright fear.

Euphoria without ambivalence was rare. Wherever pleasurable experiences were mentioned, they were typically associated with a dysphoric context, as in the following example:

#1: Joy sat down at the computer.
She has a fun.
In the event of fire, though, she knew they would all have to leave. (7)

We will consider first the milder displeasures, and "progress" toward the more sinister ones.

The Dysphoric Experience

Compulsion

The predominant picture of computer work emerging from the stories is of something one is driven to, rather than as an autonomously willed choice.

#2: In fact she wasn't sure if she wanted to do this particular program.

In some stories, the operator of the computer seems to lose agency as the syntax lapses into the passive voice:

#3: Brow furrowed, a new entry was made.

The theme of involuntary work, in one particular case, was linked to the theme of the exploitation of women. The outcome of this vignette is a relational distancing of the protagonist:

#4: Joy sat down at the computer.
She was learning computers.
But she wasn't learning fast enough to suit her boyfriend who was dependent upon her for helping him out.
So she began to resent her boyfriend and began to find him less sexually attractive.
As a result, they became less sexually active.
That was terrible.

Compulsion appears not just in coersed behavior but also in the fascination with the computer and the resulting need or desire for it:

#5a: She was mesmerized about all the gadgets she saw.

#5b: Joy likes computer very much.
She was getting addicted by computer.

A negative consequence of the magnetic quality of the computer and the compulsive features of computer use is their interference in human relationships:

#5c: When he got up the next morning, he went right over to the computer and turned it on.
His wife was quite annoyed.

Aversion

The majority of subjective states attributed to the protagonist express a general discomfort with the computing experience. It is not always clear what the occasion of aversion to working at the computer is. In one case, the dysphoria was not even experienced directly, but vicariously, as though under the sway of the defensive maneuver that Freud and the ethologists have called "displacement":

#6: Joy sat down at the computer.
And formatted a days worth of discs.
Little did he suspect that there were clouds on the horizon.
He began to think of his mother.
His mother was not feeling well in the morning.

Frequently, there are enervating or devitalizing effects of computer use. The mildest and most obvious of these is sheer tedium:

#7a: Joy sat down at the computer and thought, "what another boring day.

#7b: Storing information could be a bore!

#7c: After half an hour she was bored.
Because the material was not challenging or interesting.
So she trashed the whole thing.

A similar reaction, but in response to the quantitative rather than the qualitative character of the work, more time related than content related, is fatigue:

#8a: Guess she had worked a little too late on that program.

#8b: It was all he could do tonight.
He had already been at the computer for 14 hours.

#8c: My eyes are heavy, I feel like sleeping.
But I still have a paper to complete.

#8d: He learned how to operate it and then went to sleep.

There was mention of trips for coffee:

#9a: The program being loaded was involved and complicated.
She got a cup of coffee.

#9b: She went to get a cup of coffee.

This suggests that computer use is felt to diminish alertness, so that sustained performance requires an auxiliary stimulant.

Discomfort is not always strictly a function of tiredness or mere workload, however. There are allusions to feeling stifled by computer work:

#10a: She got up from her desk and walked outside.
She needed to get a breathe (sic.) of fresh air.

Many stories allude to such an impetus toward the outside, into the open air:

#10b: She decided to go out for a walk.

#10c: He wished he could go out into the sunshine.
But he had a lot of work to do at the computer.

#10d: What a weird toy -- She decided to leave.
She went out into the street and started walking.
She thought about all the work she had to do at home.
She really could not work at the computer all day.

Here, the computer is associated with a closed and constricted space; its image is claustrophobic. Its gravitational attraction restricts one's orbit -- it keeps one in when one could be going out:

#10e: He wondered why he always got stuck working on weekends.
He'd rather be dancing at Chippendale's.

One is inclined to ponder the possibility that the way in which microcomputers encourage the translocation of labor into the domestic space and into non-working hours may have compromised the traditional retreat into the haven of the home and the possibility of enjoying spare time there.

Not only the imagery of constricted space but also the imagery of light is implicated. In the chiaroscuro of the fantasy images, the room is a "shade-haunted space" (8) which is offset by the charm of natural illumination in the outside world:

#11a: Joy sat down at the computer.
"It was that time of the year again," she thought.
And outside the wind was blowing, the shine shining (sic.), the birds singing.

The syntagmatic slip from "sun" to "shine" only serves to emphasize the sensuous vividness of solar irradiation. But, in contrast, there is the paradoxical danger of injury from natural light:

#11b: I may as well put the shades down to cut down the screen glare.

In the cathode ray microworld, natural light is proscribed in favor of purely artifical light by virtue of a medicalized rationale. The light from the inside needs protection against the light from the outside; fluorescence supersedes illumination. (9) Shades of Blake's "dark satanic mills."

Despite the assiduous task-orientation of #10b, movement

away from the computer generally predominates over movement toward it. While the micro is consistently the center of attention, its human operators seem subject to a centrifugal tendency. (10) Physical locomotion seems to be a popular form of relief. The ambulatory creature is somehow an effective antidote to the sedentary operator. One might say that, while the sitter appears to be doing all the spelling, the walker is actually spelling the sitter. Activation of the body is revitalizing -- the antithesis of the retreat into sleep. Gross bodily movement seems liberatory and brings the individual closer to nature, while keyboard operation entails a constriction -- what neurophysiologists call "fine motor control."

Perambulation, in turn, can lead to other, clearly pleasurable activities:

#12: He decided at that point to go to a bar for a drink.

This example encourages the speculation as to whether the magnetic, centripetal power of the computer may be experienced as somehow opposed to pleasure. Certainly, on occasion, the centrifugal tendency appears peremptory and unprovoked, as though there were a spontaneous aversion to the computer. For example, the line following #2 above was:

#13: So she stopped what she was doing and pulled the plug.

What is the origin of this aversion? Most, if not all, of the excerpts so far are compatible with the hypothesis of a general aversion to work; labor may always be experienced as more or less involuntary. However, #14 suggests two other possibilities.

#14: Joy sat down at the computer.
And wished she was some place else.
Hoping to met (sic.) someone usual.

The last line here encourages the speculation that the aversion has to do with the computer not being a person, or not being "usual" -- i.e., there is something disquietingly unusual or peculiar about the computer. What this might be we shall come to in a moment.

What we can say by way of a summary so far is that there appear to be certain dynamisms in the primary orientation of the computer user. There is the dispositional transformation from passive to active, down to up, sedentary to ambulatory, and mental to physical. Second, in the realm of the spatial, there are the vectors of proximity to distance, internal to

external, and containment to release. Third, there is the ontological transition from mechanical to natural. Fourth, there is a motivational dimension from duty to inclination and tension to relief. Fifth, there is a reparative change from dark to light and devitalization to revitalization.

The overall vector dominating the imaginative constructions seems to be from pain to pleasure, or even from reality to fantasy -- from the reality principle of the computational device to the compensatory rewards of primary process. At the same time, there is an overall flavor of the shift from attachment to autonomy, reminiscent of Mahler's phases of infant and childhood "separation-individuation" (Mahler, 1972a, 1972b; Mahler, Pine, and Bergman, 1975). One cannot help noticing the value dimension to these transitions, suggesting that the centrifugal tendency represents a movement from wrong to right, a drift toward the morality of righting wrongs. The imaginative mind detects in computer work some distinctly aversive quality for which psychological and physical distancing from the computer -- retreat from consciousness and escape from the room -- are alternative remedies.

Computing itself may represent not so much a healthy attraction as a negation of the exercise of will. The price of the computer may no longer be prohibitive but, in fantasy, the computer itself remains a prohibitive object. In one story, Joy decided to go get a cup of coffee and

#15: "The computer said 'Don't move!'" (cf. Fig.1)

Anxiety

Among the dysphoric state themes, the most frequently mentioned experience is anxiety -- so much so that it warrants its own subsection here. The word 'anxiety' itself appeared regularly, although related conditions, such as being confused, perplexed, ambivalent, dismayed, tense, panicked, or paralyzed, have also been included in this category.

At the mild end of the spectrum, there is mention of confusion and perplexity:

#16a: Where did all this come from?
I am getting confused.

#16b: Norman sat down at the computer.
He found himself totally confused.

#16c: Joy sat down at the computer.
She said I am so confused.
Where do I start.

#16d: Norman sat down at the computer.
He stared at it perplexed.

Typically, the reference is to a more incapacitating state of anxiety, manifest as worry, dismay, or paralysis. In a number of cases, this anxiety appears more or less spontaneously, apparently as a function of the situation of being with the computer rather than in reaction to something the computer does:

#17a: He was so worried about writing the program.
He had to count up to 10 first in order to relax.

#17b: Norman sat down at the computer.
Then began to think of what to write.
His mind went completely blank.
He then became anxious.

#17c: Joy sat down at the computer.
And regarded it with a mixture of dismay and determination.
As time went on the stress made her ill.

#17d: Joy sat down at the computer.
And her body froze.
The icicles came down from her arms.

#17e: Joy sat down at the computer.
The tension was overwhelming and she passed out.
She had to be revived by her brother.

In other cases, it is not entirely clear what precipitates the anxious reaction, or at least what agent is responsible for the anxiety-provoking event:

#18a: Norman sat down at the computer.
This was the first time, he has ever worked on one.
He searched for the on-off switch.
It went on immediately and he looked at it.
And had an anxiety attack.

#18b: Norman sat down at the computer.
He punched up the program he had been working on.
But he discovered the computer program has been erased.
He became very anxious -- the program had been

vitally important.
Suddenly he vomited all over the terminal.

In one case only (#19, line 3 is the computer implicated explicitly in the origin of the anxiety, but even here, this is offset by the fact that the previous association (lines 1-2) indicates that the anxiety was self-generated:

#19: He made a mistake.
There was a moment of anxiety.
When the computer flashed an unpredictable light.

A psychologist might argue that the arousal at low levels of anxiety is a helpful and necessary part of skilled performance. However, this does not fit with the narratives obtained: the anxieties are more or less disabling. In only three cases was this not so, and two of these involved ignoring or overriding the anxiety rather than putting it to good use.

#20a: Joy sat down at the computer.
She turned on the monitor, the disk drive and the printer.
She felt an inward groan of anxiety about this machine.
Yet, she began to do her work.

#20b: Even though he had a mild fear of computers.
He decided to give it a try anyway.
He furrowed his brow in concentration.

#20c: Joy sat down at the computer.
She was hoping that this was a better way to write.
She found, however, that her mastery of the machine was not what she thought.
"What shall I do?" she panicked.
Suddenly she remembered what she had learned the previous week.
And that was to use the save key when storing information.

Later, we shall return to the topic of how anxieties arising in the use of the computer are ignored, avoided, or defended against. For the moment, we need to pursue the question of what exactly it might be about operating such a device that is so frightening. What we will find is that, even though the computer does not necessarily do anything in particular to precipitate anxiety, there is something about its general appearance and "presence" that is, nevertheless, disturbing.

The Alien Mechanism

Reification

Considering that so much of the anxiety appearing in the fantasy stories is unprovoked and so little is ameliorated, one is led to inquire of Norman and Joy 'Why so apprehensive?' Many of the stories focus on a state of high anxiety without accounting for its origins. However, this should not be taken to imply that the computer itself escapes critical scrutiny -- far from it. In many of the vignettes, there is more of a focus on the objective events than on the protagonist's subjective states, and negative qualities are attributed directly to the computer. The thematic content of these stories suggests that what triggers a malaise may be something about the computer itself -- not what it does, but what it is.

A significant aspect of this reaction is the extent to which the computer as object is reified. This is evidenced by the common appearance in the stories of what Marx (1953, p.311) called 'petrified relations,' as in the use of the substantive form, "learning computers" (see, for example, #4 above), rather than the more subjective, process-oriented verb conjugations, "learning to compute," "learning computing," or "learning how to compute." Reification is reflected in the general tendency, throughout the stories, to emphasize the hardware and to ignore the role of software in mediating the relationship between computer and user. (10)

This "thingification" of technology manifests itself also in the use of the term "machine" rather than "computer" (11). In several instances this transformation is associated with what appear to be positive experiences of mastery and excitement:

#21a: She was intrigued with the machine.

#21b: She felt very exhilerated (sic.) with the power the machine gave her.

#21c: But she was more powerful than the machine.

Nevertheless, reification appeared more frequently in scenarios where negative affect predominated, as in #19a and the following:

#22a: She hesitated and looked at the grey machine sitting in front of her.

#22b: She thought the machine was as frustrating as her sex life.

#22c: It didn't seem to be offering a cue about what to do next with this machine.

#22d: She thought "Damn machines I hate them.

#22e: Then the machine started to go crazy.

Here, labeling the computer as a mere "machine" could be construed as derogatory. In one story, to be analyzed below, Joy dismisses her micro as nothing more than a "gadget."

How are we to make sense of what seem to be conflicting meanings -- pejorative and non-pejorative -- attached to the examples of reification? A possible reconciliation of the excerpts in #21 with those in #22 would be achieved if we were to understand the 'mechanization' to occur whenever what is being sought is an objectification of the relationship between self and computer, either through an affective distancing or a reduction of the interface to a purely instrumental connection. As will emerge below, the magnetic appeal of the computer and its promise of thrilling power reflect an underlying rigidification of the human relationship to it, one which Turkle (1984) has shown to have distinctly compulsive features. Under this interpretation, the apparently euphoric form of objectification may turn out to be a reaction against an unconsciously dysphoric experience.

The use of the generic, superordinate term "machine," whether as a means to rise above the computer or to subordinate oneself to it, seems designed as a leveling ploy, reducing the computer to a merely mechanical device. At this level, there emerge objections to the complexity of the instrument, as in the following:

#23: It had so many buttons!
She was horrified.

For one Joy, the complexity of the instrumentation was sufficient to elicit what would seem to be a defensive act of denial:

#24: Joy sat down at the computer.
The keyboard looked like the cockpit of a Boeing 747.
It was not intimidating at all.

However, 'technophobic' reactions were typically couched in more or less cliched expressions of antipathy toward mechanical things, as in "They are so complicated," or "Machines are too complex."

The sinister

In #14 above, we witnessed the elliptical suggestion that the computer may be aversive because it is unusual -- sufficiently so to make Joy wish she were "some place else." What we learn from the derogatory connotations attached to calling the computer a "machine" is that anxiety may not be just a function of some internal problem of the self but, instead, may reflect qualities inherent in the computer itself. Such a shift of emphasis from the subject to the object allows the tedium of computer work, detailed above, to be reified as a quality of dullness inherent in the computer itself, as suggested, for instance, by the "gray machine" of example #22a. Similarly, the retreat from the computer may be less a function of subjective states of alienation than a result of something alienating in the technology itself. (12)

In the fantasies, a number of remarks seem to imply an aversively alien or deviant character to the computer. For example, in #10d, Joy exits rather hastily because the computer is "weird" and, in #14, she wishes she could escape the computer to meet "someone usual." The inauthentic character of the computer was intimated by one writer who protested, "User-friendly? Fiction, mere fiction." In another story, Joy feels that "the impersonality was alienating." Conceivably, then, the variety of aggressive impulses visited upon the mechanical hardware itself, as witnessed in #13 and #18b -- not to mention the various verbal expressions of anger, as in "Damn machines, I hate them" (#22d) -- may be a consequence of alien qualities perceived in the technological object. We tend both to fear and to attack the 'foreign' (Frank, 1967; Allen & Broughton, in preparation).

We noted earlier the implicit equation of computer with darkness, with the "shade-haunted space." If the Prince of Darkness is the Devil, then it should come as little surprise that various evil qualities are attributed to the computer. In the fantasy stories, it appears to take on a variety of disturbing characteristics, ranging from the uncanny to the ugly and repulsive. It is almost as if the very responsiveness of the keyboard to a light touch sharpens awareness of the computer's darker side. On the one hand, there is the dextrous instrument but, on the other, there is the sinister device:

#25a: Norman sat down at the computer.

He looked for the switches with which to control the instrument.
The screen glowed ominously.
It was green and bilious hued.
And I wanted to change the color but the command button was stuck.

#25b: Joy sat down at the computer.
And prepared to log on.
But the computer went off.
And began to make strange noises.
She believed that the noises came from the room.
She's disturbed by the noises.
She opened the door slowly and saw a dim light at the bottom of the stairs.
"Hello, who's there"? she cried out.
The only response was a printed command.

Here, the computer no longer asserts its authority passively or indirectly, by its evocation of states of hypnosis or addiction, but actively and directly. The tool becomes the author; the slave turns into the master. But it is a wicked rather than a beneficent master, a dictator rather than a provider -- recalling again the earlier machinery of Blake's "dark, satanic mills."

The mechanism no longer responds to commands, preferring to issue them itself. The demands of computer work pass over into commands. The commander is in deadly earnest:

#26: Norman sat down at the computer.
It was as if death was at hand.

The computer not only devitalizes, but also immobilizes, as in the scene where Joy gets up to go for some coffee and the computer says 'Don't move!' (Fig. 1). The protagonist, faced with this implacable commander, and experiencing diminution in his or her own volition, may retaliate. Self-defense seems justified, even to the point of cutting off the life support system of this other. To cite in full the segment previously quoted in #2 and #13:

#27: In fact, she wasn't sure that she wanted to do this particular program.
So she stopped what she was doing and pulled the plug.

But, as we saw in example #25b, the computer displays a mysterious degree of autonomy. It possesses its own power, and so can operate even without electrical current.

The authority of the computer is not merely political. It has an epistemic genesis. With this comes the sense of taboo, the

proscription of desire attached to knowledge itself, the second thought following rapidly upon the heels of the first. Computer corporations were not slow to capitalize on this central theme in the cultural power of high technology -- hence the 'Apple':

#28: Norman sat down at the computer.
He placed his apple on top of the terminal.
He thought of taking a byte of his apple and laughed.
But maybe the fruit is forbidden, he thought.
Second thoughts flooded his mind.

If we review #25, #26, and #28, what is impressive is a differential in initiative. In the face of the superior intelligence that is the ultimate judge, the operator feels relatively powerless. The machine no longer responds. To borrow Sartre's (1953) terms, it is an 'in-itself' and a 'for-itself,' not a 'for the other.' In proportion to the magnificent independence of the computer, Joy and Norman become all the more dependent. Following the normal dynamics of dependence (Kovel, 1978), to the extent that the machine does not need them, the salience of their need for the machine approaches a maximum.

Danger

From our review of the fantasy stories, the relationship to the computer would appear to be not only one of subjection, but also one in which there is the constant potential for danger, a threat implicit in the self-sufficient potency that the computer appears to possess. The malignancy of power ruptures the constructiveness of work.

#29a: Joy sat down at the computer.
She put her belongings on the floor beside her.
She switched on the power.
The light suddenly came on and she physically recoiled.

#29b: With a wicked smile, he proceeded to turn on the power switch.
Lightning flashed across the screen. (13)

The dark side of the computer reveals itself most dramatically in fantasies that transgress the merely uncanny, sinister, or even authoritarian, stepping behind scenarios of conflict or subordination to locate images of preemptive disruption and injury. In the imaginary, the ideal rationality of

the machine casts a tragic shadow in which lurk irruptions of irrationality, often in a violent form. The calculated and lawful functioning of the system brings with it the unexpected accident. The quickness of the machine is matched by the suddenness of the calamity.

#30a: Norman sat down at the computer.
One of the legs on the chair broke.
He landed on his behind and cursed and kicked the terminal.

#30b: Joy sat down at the computer.
As she crossed her legs to get comfortable, she split her nylon tights.
She became angry at her stupid mistake and swore and struck the computer.
When she struck the computer, she hurt her hand.

Some of the accidents are more punitive than others. "It was as if death was at hand," Norman's ominous intuition upon sitting down at the computer (#26), turns out to be more than mere fancy; the terminal is, for some, aptly named:

#31a: Norman sat down at the computer.
With swift, sure keystrokes, she (sic.) began typing the opening paragraph of her dissertation.
She was very excited because she was just beginning her project.
Then all of a sudden the whole thing exploded.

#31b: My eyes are heavy, I feel like sleeping.
But I still have a paper to complete.
I think I'll explode.
Help me, I need a degree.
Help yourself!
She got electrocuted.

In the first of these tragedies, the 'punishment' follows directly upon euphoric aspiration, reminding us of how intimately related pleasure and danger are, at least in the subjective realm (cf. Vance, 1984). In the other story, the retribution appears to be a consequence of petitioning the machine for help. Here, the micro is Thomas Hardy's malignant deity incarnate.

It is important to note that in these various sorry tales, the mishaps occur without any overt provocation. In only one case was the 'accident' consequent upon an unsolicited act of aggression on the part of the operator:

#32: Norman sat down at the computer.

So what?
She opened up the back of the computer and ripped out the wires.
She gave herself electric shock therapy.

Nevertheless, it is interesting to note, on occasions, a certain indeterminacy about the precise location of the danger. To return to examples #31a and #31b, for example, it is noticeable that in one case it is "the whole thing" that explodes while, in the other, it is the self that threatens to explode. Similarly, in example #29b, it is the operator, not the machine, that sports the wicked smile. These observations suggest that it may be the situation of computer use or the human-computer relationship that is malignant or explosive, rather than the computer itself.

The Fantastic Subject

Reverie

There is a sense in which everything that we have discussed so far amounts to primary process of some kind, since all the protocols are fantasy narratives. However, it is noticeable in the stories how frequently the protagonists, Joy and Norman, themselves experience primary process as a moment of their own subjectivity.

Primary process enters into the computer narratives as a subjective state in a variety of ways. What is noticeable is that it is so frequently treated negatively. Often it is treated impersonally as an undesirable distraction from the task at hand. We have already seen examples of this in #6, where rather than using the formatted diskettes, Joy lapses into a daydream about her/his mother, or #11a, where, upon sitting down to work, Joy's fancy immediately turns to thoughts of nature and the seasons. In another instance, reverie is at first used in a task-oriented way, but soon passes over into a mere interference, the possible personal significance of the remembrance being dismissed:

#33: He slowly began to dream about a program.
He remembered some things from childhood that interrupted his concentration.

In addition to parents, nature, and childhood, the altered states of consciousness that we have already encountered include a variety of concerns or attitudes, ranging from a hypnotic attachment to the hardware (#5a), to morbid states, as in Joy's preoccupation with incendiary disaster (#1) and explosion (#31b) and Norman's presentiments of death (#26). Overall, one is hard put to avoid the pervasively puritanical attitude toward reverie that manifests itself in the stories. For example, humorous and alimentary imaginings are confronted with a stern taboo (#28). In addition, dream thoughts are dismissed as epiphenomena:

#34a: She thought about last night's dream, when computers danced in her head.
Guess she had worked a little too late on that program;

sexual fantasies come up against the harsh reality of marital promises:

#34b: Norman sat down at the computer.

He took a deep breath.
And began to fantasize about that morning's happenings.
She fantasized about her favorite lover.
She's in a good mood.
The thought of her impending wedding made her think about John.
And his memory made her jittery (14),

and terpsichorean daydreams are dismissed as merely mind-trips into the light fantastic:

#34c: He soon started fantasizing about being a go-go dancer.
But knew it was only a dream.

Fantasy is permitted only a brief flight; it is quickly made an occasion of self-control, a restoration of the authority of reason. The 'oneiric' -- the mythopoetic underworld of consciousness -- is set up in this way as not only unreal but also illicit, especially in the workplace, and perhaps even dangerous. This stern attitude -- 'Daydreaming is all very well, but...' -- appears again in the following two cases:

#35a: What milestone would he make today in his program.
Perhaps he would invent a short-cut to Shangri La.
But he'd have to figure out the program first.

#35b: He was ready to play Pac Man.
He wanted to get over 15,000 points.
But he was too slow and stupid.

Here, the protagonist does not stray so far from the relationship to the console, but he lapses into idealistic exaggeration, only to sober himself up sharply with a cold splash of realism. No punitive reminder from the computer itself is required here. Authority is internalized and self-control occludes the limitless horizon of desire.

Play

Much as reverie is the counterpoint to concentration, the opposite of work is play -- a more extended form of fantasy than daydreaming and one implying that the protagonist is physically 'off task' as well as mentally so. Play was the predominant form in which primary process made its appearance in the stories. In its mildest form, there was a desire or attempt to weld the ludic impulse with the constraints of the computer, downgrading the machine to the level of a mere toy (cf. #10d), or

using it in a game-playing (#35b) or graphics mode:

#36a: She couldn't wait to try it.
She had nothing to lose; it was just a new toy, a game.
So we started playing with it.

#36b: He wished it was a 'video game' instead.

#36c: Joy sat down at the computer.
She decided to play a game.

#36d: She began to use color lights and develop a pattern.

Play serves defensively as a divertissement, an escape from work and work-related difficulties, as depicted in the following:

#37a: So he took out the instruction manual.
It wasn't very helpful.
So he decided to give up the computer and take tennis instead.

#37b: Norman sat down at the computer.
He was so worried about writing the program.
He had to count up to 10 first in order to relax.
Thought he'd start with a group of graphs.
Then he thought he'd just play a game.
So he looked through his pile of disc's and found one called Stary Night (sic.).

The simultaneous and paradoxical relations of continuity and mutual exclusion between work and play are captured in the next example, which is actually the full story behind #36b above.

#38: Norman sat down at the computer.
He wanted to write a story and would use his word processor.
But suddenly he realized to use finger paint and not the word pro.
So he went to the playroom and got the watercolors.
He started to mix some paints.
And came up with an extraordinary computer graphic.
It was something that would change the face of previous graphics.
He wished it was a 'video game' instead.

This last narrative possesses two additional features of interest. First, the expressive function of play seems to be exaggerated, perhaps with the intention of putting it in sharp relief against the background of the instrumental activity of

word processing. The expressive mode chosen is one which is characteristic of children's play, suggesting that, subjectively, the relation of expressive to instrumental may implicate the tension between the immature or regressive and the mature or progressive (cf. #33). The reference to using the hand for spontaneous daubing rather than in its mode of precisely controlled digital manipulation underlines the oppositions of 'controlled:uncontrolled,' 'skilled:unskilled,' 'work:fun,' 'scientific:aesthetic,' or even 'analog:digital' (if the pun may be excused).

On the other hand, example #38 reveals ways in which there may be transitional zones between the poles of these oppositions. After all, in this story, the word processor was first invoked creatively, as a means to writing a story. Moreover, in a paradigm instance of symbolic condensation, the mixing of paints merges into the creation of computer graphics, bringing the prodigal Norman back home to his travail again. The grandiose and flowery sequela -- "It was something that would change the face of computer graphics" -- returns us to a stress upon the functional, goal-directed nature of artistic activity with the computer: art <u>is</u> science, or play <u>is</u> work. The next sentence adds a further twist: even graphic uses of the computer are still serious, and not playful enough for some. Finally, it should be noted that, according to the plot, finger-painting was first conceived as a substitute for the word processor -- presumably a means to the same or a similar end. Of course, there is a certain irony here since, from the point of view of the subjects themselves, what the finger-painting theme is doing is precisely the writing of a story!

We are certainly at risk, here, of over-interpreting a single example. However, all of these observations appear to converge upon an interesting moral lesson: Between the poles of instrumental and expressive, between "playing and reality," there lies not a vacuum but a versatile space of transitions. At least one author (Winnicott, 1971), has found that it is precisely along this seashore that the imagination litters its joyful experiments. In the liminal zone, alternations of fusion and fission generate a manifold of diverse possibilities of experience. It is out of this amphibious world of symbolic condensations and displacements that the dream and the substance arise, not only of subjectivity but also of culture and communication (Buck-Morss, 1987).

<u>Rhythm</u>

The surplus of work finds its antithesis in the catharsis

of music and dance. The rigorous Apollonian life of intellectual labor and learning, with its tenuous promise of delayed gratification, pales in comparison to the carnivalesque glow of Dionysian revelry, with its rich and immediate satisfactions. In the words of Marx (1953) -- referring to the alienation of labor, not the anticipation of a visit by his in-laws -- "Those petrified relations must be forced to dance by singing to them their own melody" (p.311).

#39: Joy sat down at the computer.
She decided to play a game.
"Oh boy now I'll have some fun she thought.
The lights were bright the music blasting, she was very excited.
She started dancing.
She couldn't stop.
It was an uncontrollable impulse.

Such uninhibited revelry provides a stark contrast to the computer sweatshop, and stimulates the centrifugal tendency, as in the following story:

#40: Norman sat down at the computer.
Norman turned on the computer.
He wondered why he always got stuck working on weekends.
He'd rather be dancing at Chippendale's.
He soon started fantasizing about being a go-go dancer.
But knew it was only a dream.
Nevertheless it bothers me.

The strife between work and play echoes that between accomplishment and pleasure, duty and inclination, which has been a repeated theme in our analysis above. The subjective reality of that strife is nowhere better captured, however, than in the following story:

#41: Joy sat down at the computer.
He's touching the key board.
And the music was full and low.
Would the tiny click click of the keys destroy the mood.
It is unlike the silent gliding of ink on paper.

In #41, the rich aesthetic textures, full and low, are artfully juxtaposed with the impoverished mechanical tonality that is small and high; the substantial and sensuous is contrasted with the diminutive and hollow. Moreover, mechanized sound is attributed the power to spoil the pleasurable sensations evoked by music. Finally, in the last line, we have a poignant nostalgia

for the traditional forms of literacy, denigrating the din of machines that traffic in script.

Despite this wistful critique of Joy's, the hope of harmony between person and machine is not entirely given up:

#42a: Joy turned on the machine.
She sat and watched the screen, listening to its hum.
She then began to hum the Battle Hymn Republic.
As she hums she wants the figures on the screen.

#42b: Joy sat down at the computer.
She was mesmerized about all the gadgets she saw.
I want to have a rock and roll time.
Rock and roll is better than computers.
I love rock and roll, but I also love input and output.
No-one cared why she got up and began dancing to the music, but she was happy listening to the beat mingling with the hum of the computer.

In these examples, the moment of aesthetic release follows immediately upon the initial engagement with the apparatus -- the Dionysian follows upon the Apollonian. Following the interpretation of tedium and fatigue above, we might suspect that primary process is a more or less desperate reaction to the deleterious effects of excessively demanding intellectual labor on the stable organization of the mind. For example (cf. #5b and #34a above):

#43: Joy likes computer very much.
She was getting addicted by computer.
She thought about last night's dream, when computers danced in her head.
Guess she had worked a little too late on that program.

This story suggests that primary process appears reactively and is more a result of stress or fatigue than creative imagination. Such an interpretation fits with the popular view that "fantasy is now recognized as serving many useful functions" (Brody, 1986, p.8). Yet what is "recognized" is only the objective instrumentality of fantasy; the playful subject goes unacknowledged. Play is a haven in a heartless world, a temporary escape from work that nevertheless confirms the reality of its regimen. In the words of Adorno, "He who whistles at the world does not realise that he whistles its tune." It is true that there is a need for the renewal provided by sensuous activity and it is precipitated by the alienation of computational labor. The intent to make a joyful noise and the desire to salve rational coherence in a different kind of consistency -- the unity of

rhythm -- acts to rescue whatever vitality feels deadened in the Apollonian quest.

Nevertheless, in the words of Benjamin (1974), "In the image of happiness there whirls, inalienably, the image of redemption" (p.693). We need to amend the opposition between time 'on task' and time 'off task' suggested earlier. What would appear to be at work is something other than a simple opposition. It is not merely a case of 'R & R' compensating an overtaxed laborer. Rather, rhythmic release of the body and its senses acts to redeem the worth of the rational deliberations and formal constructions at work in intellectual operations.

Admittedly, in #42, certain oppositions are again implied: visual and auditory appreciation versus instrumental activity, happiness versus causal explanation. Yet there are also signs of reconciliation, a parallel compromise to that which we identified in #38 above. The musical and the mechanical are reconciled insofar as a continuity is perceived at the level of sound and its pure rhythmicity. Note that it is at the level of the common denominators, motion and energy, that the synthesis emerges. The mediation is enhanced in one case by equating the abstract, recursive cybernetic loop of "input and output" with the repetitive physical oscillation of "rock and roll" -- in-and-out with to-and-fro. In the other case, the mediation is enhanced by stressing, on the side of the computer, the electrical rather than the mechanical and, on the side of the human, the physical resonance or percussive sensitivity of the body. It may not be coincidental that this consiliatory manner of speaking is reminiscent of the discourse of sexual intimacy. "I sing the body electric," and all that.

The ambiguity of terms like "hum" (#42a) or "keyboard" (#41) serve to remind us again that there are highly permeable loci in the boundaries between art and science, play and work, as indeed there would have to be in order for these couplets to have a vital connection of any kind, rather than being merely arbitrary pairings.

The Impulsive Moment

We have become accustomed to the conventional picture of the conscientious individual applying himself or herself to the rigorous but enjoyable task of acquiring skilled performance at the keyboard. It pervades not only computer advertising but also the non-commercial literature of educational, psychological and other technological journals. Nevertheless, this icon of mental labor exists in tension with images from another domain, a nether level of non-intellectualized need. The fantasy narratives appear to provide the romantic opportunity: out of the interstices of calculated computational life bursts the polymorphous life of sexual and aggressive impulse: oral, anal, urethral, and genital.

Aggression

Abusive behavior toward the computer was a common event in the stories. The abuse was sometimes confined to the verbal form, as in #22d and the following:

#44a: "Damn these computers!"

#44b: "I hate computers".

#44c: She hit the switch look again (sic.) and cursed.
Cursed in a language the spell check did not contain.
She did it again.
And again, and again and again.

Verbal abuse was often accompanied by physical aggression, as we have seen: "He...cursed and kicked the terminal" (#30a); "She...swore and struck the computer" (#30b). Physical aggression also appeared on its own, varying from the relatively mild, "She...pulled the plug" (#27), to the relatively violent, "She opened up the back of the computer and ripped out the wires" (#32).

The spontaneity of the aggressive impulse is indicated by the fact that, in each of these cases, the aggression was not provoked by the computer. Where, by contrast, the aggression is reactive, it is either in the form of a pre-emptive strike (#45a, cf. #26) or a disproportionately vindictive, even sadistic

response (#45b):

#45a: It was as if death was at hand.
He prepared to launch an attack.

#45b: He started pressing the keys to see what would happen.
Then the machine started to go crazy.
So he kicked the crap out of it.
And became a homosexual.
He wasn't into this, and became bisexual. (15)

Genitality

Genital sexual themes appeared with roughly the same frequency as aggressive ones. We have already been privy to Joy's sexual secrets in #34b. Two more explicitly sexual themes emerged as follows:

#46a: Everything had gone wrong that day, and working with the machine was frustrating.
She thought the machine was as frustrating as her sex life.
So she started playing forcefully with the keys and really turned it on.

#46b: This is an important aspect of programming.
But she still decided to go to bed alone.

When we add #4 above to this group, and perhaps #5c as well, the overall tenor of the genital sexual themes appears one of dissatisfaction, frustration, and anxiety, resulting in maneuvers of a more or less defensive kind. Only in #46a is there any semblance of gratification, but here it is still a compensatory maneuver, one suffused with surplus aggression. The computer's role is variously defined: as interfering in sexual relationships or as implicated in the decline of desire; as stimulating sexual fantasies or arousing sexual feelings inappropriately; or as a surrogate object of desire. There is a certain congruence here with the drift of #44, too, where the disruption in the relationship to the computer precipitates instability in the protagonist's sexuality.

Orality

Food and beverages were frequent visitors to the folded

pages. We have already seen the role of imbibing stimulants in examples #9a, #9b, and #12: "The program being loaded was involved and complicated. She got a cup of coffee"; "She went to get a cup of coffee"; and "He decided at that point to go to a bar for a drink." Often, these cases of distraction and leaving the field are reactive: they constitute responses, more or less defensive in nature, to difficulties in the work itself. Nevertheless, there is an immediacy about appetite itself:

#47: Joy sat down at the computer.
She began to think of food.

Here, one might psychologize the issue and describe Joy's behavior as 'impulsive.' However, there is another possible interpretation, a more ontological account that stresses the valence of the immediate objective environment (cf. Lewin, 1935). In concrete terms, appetite seems to be switched on by the very fact of being situated in front of the computer -- before the operations of computation commence, and even before the machine itself has been switched on. (16)

In another scenario, yet again a time out from computer operation, the salience of bodily function in general is expressed by combining the need for ingestion with the need for elimination.

#48: He rose from his seat.
He went to the bathroom, grabbed a beer and a bag of doritos, and went back to the terminal.

The body as an input-output system, with its own operational characteristics and maintenance imperatives, is set up in parallel with the computer -- the substance-processing system over against the information-processing system. When we consider the systems terminology of "feedback" and "feedforward," it would appear that such analogies are built into the very foundation of computing discourse (Faber, 1984).

Often, the quest for oral satisfaction, like the search for sexual gratification, is not fulfilled or is even directly frustrated:

#49a: Joy sat down at the computer.
She wished she had something to eat.
Her tastebuds tingled with anticipation.

#49b: Joy sat down at the computer.
She took a bite from her stale bagel.
It must have been lunch time.
She went to the corner diner.

Where she ordered your basic steak and eggs.
But the oven just wouldn't work.

Here, there appears to be some implicit parallel -- whether analogy or opposition -- between the computer and the oven, drawing closer the symbolic juxtaposition of the system of information flow and the system of nutrient flow. The introduction of the oven may represent an awareness that there is more than a parallel at stake: digestive operations necessarily depend upon technology (Levi-Strauss, 1969) so that, cybernetically, machinery is incorporated into the system of basic human survival. Not only does the machine "digest" its input in a manner comparable to the human; at the experiential level, it also enters into and participates in the human digestive process as a functional component.

There is a theme of 'delay of gratification' running through many of the stories. As example #49b reminds us, to err is not only human: the potential of the computer for malfunctioning presents an intrinsic threat to human survival. It is not just that technology is introduced into the digestive cycle, but that this technology fails, deferring satisfaction, and leaving the tastebuds in the lurch, probably tingling even more from frustration. There is a moral dimension to this involuntary curbing of appetite: witness example #28 above. That story of the apple made the ambivalent connection of eating to knowing apparent, as does the following (an expansion of example #47):

#50: Joy sat down at the computer.
She began to think of food.
Bananas is her favorite food.
How do I began (sic.) to digest this gadget?

This example suggests that another possibility in the alimentary symbolic domain is that the computer itself may be experienced as aliment. Joy and Norman's preoccupation with eating and drinking may be something more than just resistance to technology, a disruption of its field of influence, or a compensation for the deprivations of the body caused by the escalation of intellectual labor. In addition or instead, it may be a reflection of the continuity, more or less problematic, between mechanical and organic function. (17)

If both the computer and food both need to be digested, one can see why they might stand in opposition. Although digestion may act as a common denominator uniting the nutritional and informational, physical and mental sustenance would then be in essential disharmony. The one tends to exclude the other insofar as they are both competing for the same 'final common path.' The 'impulsive' quality of oral need may then be less a comment on

the psychic make-up of the protagonists than it is a reflection of this binary dichotomy. Phasic demands from the body appear in reaction to the chronic demands of computational labor. (18)

The Dominating Relationship

Mastery

A number of descriptions in the stories bear witness to the significance of personal control:

#51a: Norman sat down at the computer.
He was determined to master the word processor.

#51b: Joy sat down at the computer.
She placed her hand on the instrument of the keyboard, ready to begin.
Fingers flying, she "keyed on" and began her program.
She felt exhilerated (sic.) with the power the machine gave her.

#51c: She felt very inadequate.
But she decided to rally forth by trying to overcome it.
She would not be mastered, she would be the one to control it.

Certainly, these examples testify to the need for mastery, and to the hope that the machine will lend its power to the operator. However, at the same time, the phrasing of these excerpts raises the question of how unhealthy and compulsive that need may be. #51c suggests that the concern for control may be driven, emerging not from a spontaneous desire to achieve a specific goal but in reaction to a negative self-image, a feeling of being "very inadequate." The focus is not on using the computer as a tool to get something done, but on sheer conquest: "trying to overcome it." The relationship between self and computer is conceived not just in instrumental but also in adversarial terms. It is a matter of the best defense being a good offense -- an attitude of 'Control it before it controls you.' The outcomes of this zero-sum game are polarized in terms of two opposite extremes:

#52: The impersonality was alienating.
The loneliness of being number 1.
And the agony of defeat!

The determined quest for control is motivated as much by the aversive image of subjugation as by the ideal image of synergy. Narrowly escaping defeat frequently gives rise to a brief intoxication, Joy's "exhilerated" (sic.) feeling or "flying" sensation (#78) -- the 'high' subliminally promised by applying

to modern electronic commodities the rubric 'high technology.' Turkle (1984) has described this craving for control as "mastery in the service of the desire to operate just on the edge of disaster" (p.175), and Balint (1959) and Lichtenberg (1984) have demonstrated how such thrill-seeking represents a defensive psychological regression. (19)

The defensive, anti-depressant nature of this kind of excitement is reflected in its transitory and illusory quality: the sense of control need not necessarily be an indication of real learning or competence at the keyboard (Broughton, 1985). Between the sensation and the mastery falls the shadow. The impression of being in control is deceptive and tends to lull the subject into a false sense of security:

#53a: Joy sat down at the computer.
She was hoping that this was a better way to write.
She found, however, that her mastery of the machine was not what she thought.

#53b: The light suddenly came on and she physically recoiled.
But she was more powerful than the machine.
Well, at least she felt she was more powerful.
She started wondering whether in fact the computer was more powerful than she.

In #53b, the reactive, self-protective nature of the delusion is apparent: Joy's empowerment of her self-image occurs in response to the computer's activity, the shocking simplicity of "the power coming on." Like most defenses, the feeling of mastery is only a temporary one, an intoxicating assertion of independence, a brief protest against dependence upon a powerful other before sobering up and returning to its charge again (cf. Bateson, 1971). As Mahler (1972a), Eichenbaum & Orbach (1983), and others have suggested, a phasic feeling of independence is not incompatible with a chronic state of dependence. To the clinical mind, what at first glance appears to be admirable perseverance, at second glance seems closer to perseveration; persistence is revealed as resistance, action as reaction. The counterphobic defense belies the phobia. Hyperactivity signals the dread of immobilization. When a subject in hot pursuit of control (like Norman in #51a above) proclaims how determined he or she is, it becomes clear how determined he or she is. Dependent variables prefer to cloak themselves in the garb of independent variables.

A certain kind of dedication or addiction to mastery, then, can be a form of subservience:

#54: Norman sat down at the computer.

And began to punch in data.
The computer received it obediently.
And the equally obedient "master" was triumphant.
Until the word "error" appeared.

This example expresses the realization that gaining control over technology does not necessarily entail freedom from dependence; even successful mastery over the computer can constitute a subjection to its order.

Dependence

The line of argument pursued above uses the fantasy data to call into question the common assumption that there is a natural, healthy, and straightforward human need for control. Rather, the desire for mastery should be interpreted as both compulsive and defensive: a flight into an illusory independence triggered by threatening feelings of dependence. On this account, when the beleaguered individual seizes upon the emblems of autonomy -- self-direction and individual control -- we should take this not as the apotheosis of the will but as its symbolic capitulation; the involuntary is struggling to signal its absence through the tokens of the voluntary. In this regard, the findings of the present study converge with the research results reported in various areas of the psychological literature that have unmasked the ulterior motives of the drive toward mastery -- studies in the areas of personality psychology (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950), clinical psychology (von Gebsattel, 1958; Shapiro, 1981; Strauss, 1948), child psychology (Weininger, 1975), feminist social psychology (Benjamin, 1987; Bragonier, 1985; Dinnerstein, 1976), education (Miller, 1983; Walkerdine, 1985), and political sociology (Habermas, 1975; Kontos, 1975; Memmi, 1966).

This reinterpretation of mastery as defense, as a foreclosure of freedom rather than a successful attempt to purchase it, may help us to understand better the pervasive anxiety in the fantasy data that we noted earlier in this chapter. It is the expressive, not the defensive responses to experiences of failure and feelings of intimidation that illuminate the underlying emotional significance of computing. If we inspect the fantasies in which states of anxiety, confusion, and need are acknowledged rather than suppressed, we find that these states are frequently associated with a condition of dependence. The awareness of ignorance or incompetence leads to reliance on an auxiliary for instruction or assistance:

#55a: Now he didn't know how to fix it so he went to call for help.

#55b: Joy sat down at the computer.
And attempted to enter the computer system.
The computer responded in machine language and the operator looked around for help.

#55c: He wanted to learn how to use it.
He turned it on, but was stymied as to what to do next.
So he took out the instruction manual.
It wasn't very helpful.

#55d: Joy became so frustrated because she couldn't even log on.
She located an instruction booklet.
She opened to the first page.

#55e: She looked around to ask someone for help.
Nobody responded.
She gave it a perplexed glance and looked for someone to help her.
After all, the booklet wasn't the easiest thing to follow.
It needed to be made user-friendly.
That was always the promise. User-friendly? Fiction, mere fiction.

#55f: Norman sat down at the computer.
He immediately stood up and went to the computer consultant for help.
However, he was out to lunch.
I will wait 20 mins. max for him to return from lunch.
She waited and waited, but he did not return.

#55g: The cursor blinked endlessly.
It didn't seem to be offering a cue about what to do next with this machine.
Back to the manual!

#55h: He found himself totally confused.
So he read 'How to Operate the Computer in Five Steps' Manual but it still didn't help.
So he called over a friend to help.
His friend got him out of his bind.
There's nothing like a close friend!

What is interesting about these examples is not only the degree of felt dependence occasioned by the computing experience but also the lack of anything or anyone to depend on. According to these episodes, it would seem that neither the machine itself nor the immediate human context associated with computing is nurturant. Expert advice is inaccessible or inadequate. It is hard to get to first base with the consultant and hard to get past page 1 or step 1 in the book. The impersonal nature of

expertise, its failure to provide what is needed, and the frustration that results are captured succinctly in the following refrain:

> #56: They always do.
> Teach you the commands after you need them.
> That's a hell of a thing!

It is as though the technology were designed to foster precisely those needs that it is incapable of satisfying. The computer is a rugged individualist, inclined to be intolerant of the non-independent (i.e., non-defensive) user. To recap the climax of story #31b above, the more desperate the plea for assistance, the less sympathetic the reply: "Help me, I need a degree. / Help yourself! / She got electrocuted."

Apparently, from the above examples, there is little in the way of succor to be had from the world of computing; only personal intimacy -- in its human form -- provides any solace. In one case (#17e), as we have seen, Joy, overwhelmed by her own inadequacy, "had to be revived by her brother." The timely proximity of the competent, helpful friend or sibling stands in opposition to the rejecting computer, on the one hand, and the dilatory, desultory, and distal object of consultation, on the other. The contrast between 'person-friendly' and 'user-friendly' is underlined.

Despite the unfriendly character of the computer and the satellites in its orbit, the protagonist typically sustains the relationship to them and their attractiveness may even intensify. One wonders why it is that Norman's or Joy's typical response is not simply to sever the connection. However, such is the characteristic dynamic of the relationship between the needy and the powerful, the interior dialectic that makes psychology indispensable to any analysis of political domination (Kovel, 1978). As demonstrated by political thought from Hegel and Marx to Arendt, Sartre, Fanon and the Frankfurt School and critical literature and drama from Kafka to Orwell, Genet, and Pinter (Kontos, 1975), dependence participates in dominion via the attachment of the dependent agent to the dominant one -- what amounts to an active collusion on the part of the subject in his or her own subjection.

The archetype of dependence is the infant (Jung, 1960/1940). The madonna, smiling beneficently at the helpless babe in arms, is a persistent icon in the semiotic twilight of Western consciousness (Kristeva, 1980). But our wishful recollections of that momentous relationship should not distract us from the uglier lessons of world history. In that larger dyad of the

"developed" nation and the "underdeveloped" one, dependence goes hand in hand with colonization; the embrace tends to pass over into the grip (Memmi, 1968). In his latest work, Memmi (1984) has underlined the tight connection between the dialectic of providing-dependence and that of domination-subjection.

Joy and Norman do not appear always to be enslaved to the computer, but this does not mean that they are not embroiled in a relation of domination. "Subjection is the totality of ways, both active and passive, in which those who are dominated can respond to the aggressive behavior of those who are dominating them" (Memmi, 1984, p.181, emphasis added). Joy and Norman hardly seem to be in a state of subjection when they strive for mastery over the computer. However, as the examples above suggest (particularly #54), we are already intuitively aware in our fantasy life how our behavior with the computer tends to play into the mystification of high technology. The appearance of innocuous tool-use and its accompanying technical language of objectified "instruments" and "operations" conceals the subtlety with which our voluntary participation in an already assembled order is coopted. Our sense of autonomy feeds off an implicit heteronomy. It is precisely the tendency to place ourselves in the hands of the authoritative other that denies in practice the "neutrality" which, in theory, that other maintains.

Infantilization

As Ihde (1975) has pointed out, "man-machine" relations require a certain de-individuation at the interface, a dissolution of identities and a subjective merging between the human and mechanical elements. The very term, 'interface' evokes the bizarre imagery of a merger of bodies and a sharing of sensitive surfaces normally considered discrete. Small surprise, then, that there are marked analogies between the way in which our subjects fantasized about the initiation of the user at the "man-machine interface" and the way in which psychologists have recently been describing the early relationship between infant and primary caretaker, prior to the subjective differentiation of the former from the latter.

Throughout the story excerpts reported above, there has been a distinct tendency to 'anthropomorphize' the microcomputer. However, the dynamics of domination and dependence suggest that, in fantasy, the computer is more than just 'an other' -- it is the primal and propadeutic (M)other (cf. Garner, Kahane, & Sprengnether, 1985). The operator is positioned in relation to the technological device in a way that evokes the original experience of heteronomy, one that fuses a need for care with a desire for the other's power. (20)

The parallel between the two dyads, 'computer-user' and 'infant-caretaker,' is suggested by fantasies such as the following:

#57: Norman sat down at the computer.
He punched up the program he had been working on.
But he discovered the computer program had been erased.
He became very anxious -- the program had been vitally important.
Suddenly he vomited all over the terminal.
His Mom came in and looked at the mess.
She couldn't believe he had done it.

There are even cases where the computer stands in for the parent:

#58: Joy sat down at the computer.
And formatted a days worth of discs.
Little did he suspect that there were clouds on the horizon.
He began to think of his mother.
His mother was not feeling well in the morning.

He thought he'd take it out on the computer.

There are vignettes suggesting blissful union and completion:

#59: Joy sat down at the computer.
To her surprise her program ran.
She was delighted with herself.
Her feet felt warm and cosy.
She was very content.
So she turned the computer off.

Such states of satisfaction we have encountered already in the sections on music, dance, and play, where the rhythmicity of relation to the other was celebrated. Csikszentmihalyi (1975) has called such euphonious states "flow" experiences, and has argued that they are particularly characteristic of sensuous and playful relating between lovers or between mother and child (Csikszentmihalyi & Massimini, 1985, p.127). In such loving interactions, there is a partial dissolution of boundaries, harking back to psychic states prior to the differentiation of the infant self from the other (see Freud, 1930; Chodorow, 1978; Silverman, Lachman, & Milich, 1982), where there is a "mutual preverbal empathy" (Mahler et al., 1975) dependent on "vocal or kinetic rhythm" (Kristeva, 1984, p.24). Following this line of interpretation, Joy's sensuous, bodily explorations of sound in #s41, 42a, and 42b would be homologous with the kinetically and sonically based syntheses between infant and maternal activity demonstrated empirically by Condon & Sander (1974), Trevarthen (1975), and Stern, Jaffe, Beebe, & Bennett (1974), among others.

At this preverbal level, visual interaction is also charged with significance:

#60: Joy sat down at the computer.
She saw some big green eyes.
Pushed a button and it smiled.

It is not just the satisfaction of corporeal needs that is important to the infant's healthy development but the establishment of a reliable and communicative gestural interaction in the face-to-face situation, what Stern (1974a) has called "the mutual maintenance of a level of attention and arousal" (p.404). This type of face-to-face orientation and mutual excitation is identifiable at all ages, as in adult conversation (Stern, 1974b). It would appear to manifest itself in that adult 'conversation' occurring at the 'interface' between person and computer.

However, as in the earlier material, the dysphoric is always nigh. The fluidity of communication gives way all too frequently to disruptive moments of what infant psychologists call "relationship disturbance," which we have witnessed already in #41 and can see again in the following:

#61a: Joy sat down at the computer.
She switched on the terminal.
And called up her program.
Something unprintable.
Came from the monitor; the computer was spewing garbage once again.

#61b: The machine bleeped and "Error" printed out on the screen.
The cursor blinked endlessly.
It didn't seem to be offering a cue about what to do next with this machine.

#61c: She asked for her last program.
However, the screen remained blank.
After she checked to insure it was plugged in, she again tried to enter.
She did not realise that computer learning could be so...frustrating.

#61d: Joy sat down at the computer.
And stared at the blank screen.
What to do?
Concentrating furiously, she tried a new tack.
It failed completely.

#61e: He started pressing the keys to see what would happen.
Then the machine started to go crazy.

#61f: Joy sat down at the computer.
She looked for the on-off switch.
She turned it on and waited.
And the computer printed the date.
This was as much as anyone could expect.
Although she expected much more.
She felt disappointed.

These scenes parallel closely the clinical and empirical findings on the disruptions occurring in expressive relations between infants and their mothers (Spitz, 1945, 1965; Fliess, 1961; Stott, 1962a, 1962b; Mahler, 1968; Tronick, Adamson, Wise, Als, & Brazelton, 1978; Stern, 1977, 1985; Murray, 1980).

In the absence of responsiveness in the mother, even the

sense of a shared communicative medium disappears, and the defense of narcissistic isolation comes into play (cf. Mahler, 1968), with its illusory promise of self-satisfaction:

#62: Joy sat down at the computer.
She positioned her fingers on the keys.
She began typing.
She called on her last program.
But the code she had used before no longer worked.
So she made up her own code and began to work.
"Some day I'll write my own computer language," she muttered.
"I'll call it Joytalk," she said to herself.

The loss of meaning to the exchanges interrupts the "flow" in the relationship, which regresses to its starting point. As Klein (1975/1945) and Bion (1967) have so graphically described, the frustration and helplessness in the face of failure fosters intolerable aggression which, in fantasy, tends to be split off and projected into the visible world in the form of fragmented persecutory objects, such as lurking insects:

#63: Joy sat down at the computer.
She incerted (sic.) her flop (sic.) disk into the disk drive and stared at the screen.
The screen stared back at her and then flashed an incomprehensible "A".
Back to the drawing board.
The bugs had not yet come out.

Segal (1964), like Klein (1975b; cf. R.Klein, 1983), finds that in infantile fantasy the craving for the goodness of the other and the fear that she is witholding things can lead to sadistic forays into the mother's body, with disturbing outcomes:

#64: It was an uncontrollable impulse.
How on earth could he resist the desire to examine the inside.
What a mess it must be in there. Meaningless.

In auspicious circumstances, such visions of the damaged maternal interior may inspire guilt and then reparative desires, though still loaded with ambivalence, as we saw in the solicitous but angry concern for the mother's welfare in #58 above.

Conclusion

> Nature has no Outline, but Imagination has. Nature has no Tune, but Imagination has. Nature has no Supernatural, and dissolves: Imagination is Eternity.
>
> William Blake, The ghost of Abel (1822)

In our trip through the primary process of young adults, we have found a variety of ways in which, as Bateson would have predicted, fantasies about technology repeatedly raise such Batesonian topics as mind-body, self, agency, relationship, dialogue, power, and transcendence. One might say, then, that we have illustrated some fundamental concerns of Batesonian theory in a new context. But the fantasies raise these concerns in a way that cannot be accounted for by a cybernetic epistemology such as Bateson's. Thus, the corpus of data reported here also sheds light on some of the limitations of Bateson's approach.

There appear to be two specific shortcomings in Bateson's world view that our findings bring to light. First, as Dell's (1985) review concludes, "Bateson delineated an epistemology, but never clearly developed a corresponding ontology" (p.1). Bateson's commitment to neofunctionalism precludes his access to the issues of being that are repeatedly raised in the computer narratives, and which call for an existential phenomenology of the subject. Such an interpretive stance toward subjectivity stands directly in opposition to cybernetic theories, which center on system control via the objective medium of information (Broughton, 1981). (21)

Second, the very exclusion of conscious instrumental reason and problem-solving strategies from the fantasy themes bears witness to the significance of unconscious symbolic processes, for which evolutionary cybernetics and information theory have no place. Although Bateson toyed with dynamic phenomena, his concern was always to reduce them to principles of system organization, thereby removing their symbolic quality. In so doing, as Habermas (1973, 1975) has pointed out in another context, neofunctionalism (just like the traditional functionalism from which it is descended) removes the possibility of understanding identity formation. The stress on

functional organization for instrumental action has a doubly homogenizing effect: both psychological and cultural specificity are occluded. Individual life history (Blasi, 1983), on the one hand, and social identity formation (Habermas, 1971, 1974; Dobert, Habermas, & Nunner-Winkler, 1987), on the other, lose their significance. The systems approach simultaneously dismantles self and culture, assisting precisely that collapse into biology on the one hand and bureaucracy and technology on the other that is so desirable from the position of authority (Gouldner, 1970; Broughton, 1987).

In brief, the fantasy narratives about computers that we have witnessed help to define the limitations of the systems approach as a general paradigm for the human sciences. It is as though, once one presses an investigation of information technology far enough into the poetics of its symbolic penumbra, the technology loses its power to provide the root metaphor for our theoretical thinking.

Bateson's oeuvre remains most conducive to insight at those junctures where he allowed his romantic suspicion of rationality to blossom, as illustrated by his dialogues with his daughter (e.g., Bateson, 1969, excerpted in M.C.Bateson, 1972, pp. 9-12) and this exchange during the 1968 Wenner-Gren conference in Gloggnitz, Austria:

> Gregory Bateson: "It's not that the machines get closer and closer to us, but..."
>
> Gertrude Hendrix: "...but we get closer and ..."
>
> (M.C.Bateson, 1972, p. 224)

He understood, and managed to convince others, that technology is a means of our self-expression as well as a product of our ingenuity, and that we therefore run the risk of idealizing the device to obscure its, and our own, vices.

Not just our factual, level-headed selves are condensed in the circuitry and programs of computer technology. Rationally, we may enter the microworld, gratefully accepting and celebrating technological progress. But beneath that compliant surface, even the few fantasies reported here reveal a dense mythopoetic underworld, the deeply conflicted psychic jungle of the imagined machine -- the truly personal computer. The invention and its potential are truly fantastic.

As an instrument, the computer may well be one of the great

products of human imagination. It needed to be produced by us precisely because it has no imagination itself. Nevertheless, as we have discovered, we are equipped and eager to use it as the instrument of further imaginings. In so doing, we draw attention to precisely that domain in which the computer is impotent -- the realm of the sensuous and expressive. Here, we do not need its help -- it needs ours. Its pretensions to the infinite are largely a cover for its shortcomings in all but a single, narrow sphere. It is the master in the medium of decontextualization: analytic reasoning, formal structures, functional computations, and recursive programs. In this domain, it corresponds to the perfection of bureaucratic organization, assuming the same posture of unquestionable authority. But outside the calculus of the system it is abjectly dependent on human beings; it leans heavily on the resources of our symbolic unconscious for the restoration of context. It was in this situation that our young adults so eagerly and easily undertook the charitable task of enriching the impoverished, giving information meaning, placing the dissociated object back in the field of the subject -- telling the story. They put the rhythm back into the algorithm.

However, as we have seen, these same enterprising subjects are not just delightful commentators. They are intrepid voyagers, confronting a dark and misanthropic underworld. Computer lobbyists have informed us (although without presenting any evidence) that the subjective impact of computing is to be understood in terms of "empowerment" -- a purely rational affect, of course. However, the subjective constructions manifesting themselves in the narratives of our graduate students do not confirm this psychological claim. (22) Instead, on our trek through the corpus of fantasies, we have encountered a variety of reservations, suspicions, and fears.

> The computer does not elicit spontaneous motivation. We are driven but not by our own drives. It uses the captive energy of our computational minds to exert a gravitational drag on our bodies. The spontaneous reaction is resistance: a centrifugal desire for release from its containment and for the liberation of the non-cognitive faculties. The computer signifies darkness and compulsion rather than enlightenment and mastery.
>
> The computer, rather than inspiring its users, provokes their anxiety and insecurity. It is peculiarly resistant to control. Rather than facilitating work, it escalates labor to new levels of tension and stress. Its mastery over nature is not experienced as natural. Instead, it stands over against us and opposes our nature.
>
> The computer evokes our dependence but fails to fulfill its promise to provide. It reminds us of a living other,

but its vitality is unpredictable and disruptive. It offers to satisfy needs that we do not yet experience and frustrates those that we already feel. Its presence is alien, sinister, and even deadly. It substitutes force fro meaning. It is coersive and threatening, to the point of being injurious.

We struggle to restore a rhythmic and fluid relationship. But it obstructs our efforts and makes us fail. It specializes in setbacks and shortfalls. It feeds us the wrong food and rejects our advances. It withdraws from interaction, closes itself off, speaks in its own language. It evokes feelings of disappointment, helplessness, and rage. If it is a parent, it is so by law, not love. The invention is the mother of necessity.

The general interpretation that has been pursued in this chapter is that the primary effect of the computing situation on the individual, in fantasy, is "infantilizing." The propadeutic power of the computer lies in its capacity to simulate, but what has not been hitherto acknowledged is that, in order to exercise this power in the cognitive sphere, it first has to simulate the initial grounding of the cognizant being. This position has been taken up increasingly by the more adventurous members of the artificial intelligence community (e.g., Winograd, 1980; Winograd & Flores, 1985; Dreyfus, 1979, 1982). However, what those authors have not considered is the possibility that the pre-simulation of being entails revisiting the developmental foundations of the psyche.

However, the implication of this is not that we naturally have to learn how to be and think again, at the generous breast of the micro. The caretaking imagery is deceptive. There is something profoundly wrong with the new orthodoxy centered on Stern, Brazelton, Trevarthen, et al. The reappearance, in the fantasies about computers, of the phenomena that they describe is therefore a disturbing one. What is unwittingly promoted by the researchers cited is a modernized Orwellian vision of the infant-mother relationship as a cybernetic communication system, electronically conceived as a networking of mutual 'tunings' and 'calibrations' designed to guide the organism through 'transitions' from one 'state' to another. The states are ordered sequentially in terms of purely bureaucratic criteria of increasing 'differentiation' and 'integration,' which are then argued to be natural and necessary because biologically grounded. As documented in detail by Harris (1987) and Kaplan & Broughton (n.d.), it is a prescription for the production of the compliant child as sub-system in the family organization and for the reproduction of the traditional mother as sole caretaker and emotional manager. In this manner, political socialization for

bureaucracy and rational authority has co-opted both the imagery of the blissful madonna-child dyad and the flashy instrumentality of gentrified technology.

Of course, issues of external and internal validity (cf. Campbell & Stanley, 1963) remain. Regarding the former, one can hardly generalize from a handful of graduate students to universal claims. Regarding the latter, we still do not know whether the fantasies explored here apply specifically to computers or more broadly to high technology, electronic devices in general, etc. For example, could it not be that either in the past or the present the reception in fantasy would have been the same for the electric typewriter? Moreover, we do not know whether the misgivings about the micro are a function of unfamiliarity. It is also possible that certain features of the narratives have to do with the form of narrative itself. Work remains to be done.

The purpose of this outing has been to raise the possibility of second thoughts. Should it turn out that the corpus of themes summarized here cannot be dismissed as a special case or as sheer artifact, then a legitimate query will have been raised about the one-sided, denarrativized view of the "information revolution" we have received. If the public euphoria is matched by a private dysphoria that remains to be given voice, it behooves us to inquire not only into the subjective apprehensions themselves, but also into the ways in which their voice tends to be silenced.

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It is rare that one can learn from and count on the same person. I dedicate this chapter to my bon camarade Jacques Voneche. I can count on him to be faintly amused by it, and I have learned from him two things: that in cognitive psychology lurks a certain false consciousness, while in biology awaits a subject worthy of the attention of even a social theorist.

I would like to express my gratitude to a variety of other people who have influenced the present work. First, my undying thanks to Colin MacGillivray (now chief architect for the Sarawak Hilton) who, around 1960, made me read a paperback novel called Last man on earth, thereby introducing me to a blessed generation of science fiction writers, particularly A.E.van Vogt, Philip K. Dick, and Fredric Brown. It was through popular literature that the diffuse intellectuality of that repressed young adolescent first became focused on the fantasy of science and on the strange relationship between humanity and technology.

During my late adolescence, my father, Ralph Broughton, was instrumental in bringing my attention to electronics, while in the college years, my brother-in-law, Richard Slee, encouraged me to sally forth into programming. My mother, Doris Broughton, taught me that even art involves technique, and so can redeem it.

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With regard to the oeuvre of Bateson, I am much indebted to the guidance and sage counsel of Ray McDermott, Herve Varenne, and Michael Dominator Watts, all of whom have made available to me "their own metaphors."

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FOOTNOTES

1. It is perhaps no coincidence that, looking back over the trajectory of my own concerns, I find similar preoccupations with the functioning of systems (Broughton, 1981, 1983; Broughton & Zahaykevich, 1982), the mind-body problem (Broughton, 1980), the concept of the self (Broughton, 1978, 1986a), the role of dialogic relationships (Berkowitz, Gibbs and Broughton, 1980; Broughton, 1982), the issue of power (Broughton, 1986b, 1987a, 1987b; Broughton & Zahaykevich, 1980), and the religious vision of transcendence (Broughton, 1986c). In a recent fit of masochism, I reread the theoretical chapter of my own dissertation on self, mind, and body (Broughton, 1975) and rediscovered that Bateson's views on these topics had been seminal in the emergence of my own obsessions.

   It would be hubris indeed to attempt to compare my own work with his. I am afraid to admit that, feeling uncomfortable with the political implications of systems theory (see Gouldner, 1970; Habermas, 1975), I have remained in permanent theoretical limbo, unable to formulate a more satisfactory Weltanschauung, or any general worldview for that matter. But I owe a considerable debt of gratitude to Bateson for legitimating the pursuit of such grand questions by non-philosophers, and showing, in his inimitable style, how they could be the occasion of considerable fun. (See, for example, M.C.Bateson, 1972).

2. In arguing for the existence of a hidden dimension to our contemporary technology I am hardly engaged in anything original. The structure of my argument runs closely parallel to that of Walter Benjamin's (1970a/1936, 1970b/1936, 1970c/1936) analysis of the eclipse of one level of experience ('involuntary' memory) by another (intellectual or 'voluntary' memory) involved in the

technological and cultural transition to modernism. Bateson himself might well have traced this tradition further back to his favorite William Blake, for whom "without contraries, there is no progression."

3. In addition to a concern for sample size, the particular course selected for the study was chosen on the grounds of its emphasis on class discussion and cooperative work. The study was conducted sufficiently late in the term to allow for the development of at least a minimal degree of group identity, and at a point where the instructor judged group morale to be at a relatively high level. Up to this point, the class had not been involved in discussions of computers or high technology, although the conduct of the study did stimulate subsequent discussion of these issues.

4. These names were chosen in the light of a desire not to initiate the fantasy narrative with a character whose ethnic identity was immediately obvious.

5. The disjunctive association technique (obscuring the beginning of the story) was preferred to a continuous one (in which the whole of the story to date is visible) because of pilot work suggesting that this reduced the tendency to "rationalize" the structure of the plot -- to make the characters behave rationally and to regulate the narrative in terms of norms of logical coherence.

6. The particular approach used here in the presentation of the material is distinctly literary, being influenced especially by three interpretive classics of psychological analysis: Freud's Psychopathology of everyday life (1901), Propp's Morphology of the folktale (1968), and Adorno's 'Stars down to earth' (1974). All three traditions -- psychoanalysis, structuralism, and critical theory -- depart from the positivist concern for frequency counts and probability estimates and rely instead upon a dialectical construction of the totality of relations between whole and parts (Jameson, 1971). Thus, despite a concern to identify prevalent themes, there is an interest in less frequent themes whenever these permit a lucid illustration of a particular phenomenon (cf. Allport, 1954). In this, I merely apply the principles of cognitive "prototypes" (Rosch, 1975). Rather than conceal the identities and differences within the corpus of fantasies that I have collected by means of arcane mathematical devices, I have tried to demonstrate that "identity of identity and difference" that exists in the results by laying out most of the data for public scrutiny in these very pages.

7. Throughout, the illustrative examples are predominantly excerpts from the complete narratives, since the unit of analysis here is the theme, and there was a strong tendency for each story to feature several themes. Some excerpts therefore overlap with others. The excerpts presented are quoted verbatim;

they are completely unedited, with the exception that an occasional period has been inserted to punctuate the end of a line.

8. The phrase is Bachelard's and is purloined from his splendid phenomenology of space, interiors, and the home (1964, p.216).

9. See Abrams, 1971, p.173.

10. This is all the more remarkable given that we know from the work of Basseches (1984) and Irwin (1985), as well as my own research (Broughton, 1978, 1982b), that the concepts of relation, process, and interaction are not at all beyond the cognitive grasp of the graduate student. It remains to be seen whether the 'reification' observed reflects a preoccupation with the "hard" in preference to the "soft," as a function of the semantic differential in gender connotations between these terms (see Keller, 1985; Haste, in press; Broughton, 1987).

11. Sheldrake (1972) has pointed to an historical trend toward an increasingly impersonal stance toward computing and, in parallel, an increasingly mechanical understanding of the computer.

12. It is perhaps no coincidence that the professionals concerned with detecting extraterrestrial 'aliens' are predominantly computer scientists (see Minsky, 1985; Regis, 1985).

13. On the violence of light, already foreshadowed in #11b, see Derrida (1978).

14. The hiatus here between the flight of fantasy and the act of being brought down to earth leads one to believe that the overall impact of this particular example may be partially or wholly an artifact. However, this story still testifies to the puritanical flavor of the computer narratives, a general suspicion of pleasurable experience.

15. I was gratified to see this particular example since elsewhere (Broughton, 1983), I had suggested, using as a fetish the recent work of Chasseguet-Smirgel (1984, see also 1985 and Honey & Broughton, 1986), how high technology has an intrinsically perverse dimension that embodies such anal sadistic tendencies. Joel Kovel (1985) has made a related argument.

16. This elicitation of desire by the mere situation of person in relation to screen is reminiscent of the hypotheseis of Metz (1975) that, in modern life, the screen has come to be a master signifier of the oral provider, an occasion for the sudden subjective registering of absence and lack. Working within a different framework, Memmi (1984) has recently made the compatible argument that there is a continuity in the age of advanced technology between need for provision of basic

satisfactions and need for televised material.

17. This issue of the interpenetration of organism and mechanism is a common focus of concern in modernity. It was prefigured in relation to the industrial era by Marx, in the 1844 manuscripts (Fromm, 1961). It preoccupied Bateson on many occasions (e.g., 1971). I have tried elsewhere to show how it takes on an especially intractable form in the emergence of computer technology and the educational demand for 'computer literacy' (Broughton, 1985).

18. Faber (1984) has pointed to the binary oppositions inherent in the feeding situation. We might note also that the early emergence of behavioral and then verbal affirmation and negation is closely tied to the infant's feeding experiences (Spitz, 1957).

19. Bateson (1979-1980) himself referred to compulsive risk-taking as a spiraling system of "threats," each of which served as a "fix (for)...staving off the feelings of deprivation" (p.23).

Although I cite here the second of the two famous communiques to the University of California Board of Regents, as the reader may discern, my analysis throughout this section is indebted to Bateson's (1971) highly original interpretation of addictive devices which he worked out first in terms of alcoholism, and only later brought to bear on the international military situation.

20. Harris, in talking of adults (1981) as well as infants (1975), reminds us that all learning takes place in an instructional context, in relation to a maternal other -- however symbolic -- who mothers the learner into existence. In a similar way, in an analysis of the dynamics of pedagogy, Portugues (1983) has suggested that it is precisely this co-presence of learner and teacher that re-evokes the separation-individuation process, with all the vestiges of its first, infantile instantiation.

21. Of course, it is possible that Bateson himself was aware of this desideratum, and had he lived longer he might have taken steps to rectify the lack.

22. As Chomsky (1972) points out, we recognize the point at which empirical psychology passes into ideology by the fact that claims are made by fiat or appeal to the self-evident and the support of empirical evidence is no longer considered to be relevant (cf. Pea & Kurland, 1984).

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